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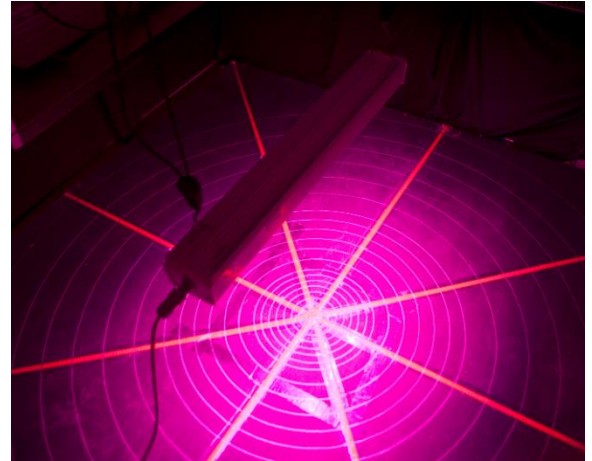


# Efficacy of Two HORTILED Fixtures

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December 2017

We tested the efficacy of the Full Spectrum and Red-Blue HORTILED TOP LED fixtures manufactured by PL Light. Both fixtures had an 80° light distribution.

The efficacy of the fixtures was measured using flat plane integration as described by [Nelson and Bugbee \(2014\)](#)<sup>1</sup> (see adjacent photo). The fixtures were suspended at 0.65 m above the floor in a 3 × 3 m room with flat black walls. The photosynthetic photon flux density (PPFD,  $\mu\text{mol} \cdot \text{m}^{-2} \cdot \text{s}^{-1}$ ) was measured with a recently calibrated quantum sensor (LI-COR model 190R). Measurements were made 2.5 cm apart near the center, increasing to 10 cm near the edge, and extrapolated to infinity using an exponential decay function.

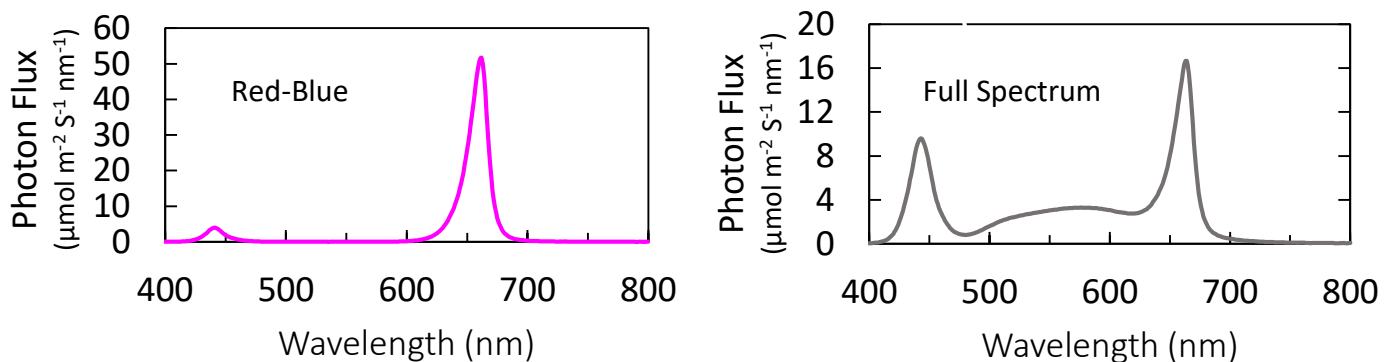


## Results

	Fixture Color	
	Red-Blue	Full Spectrum
Input (V/A/W)	120/2.60/313	120/2.80/336
Measured PPF( $\mu\text{mol/s}$ )	771.9	642.5
Extrapolated PPF( $\mu\text{mol/s}$ )	26.2	25.2
Total Output PPF ( $\mu\text{mol/s}$ )	798.1	667.7
<b>Efficacy (<math>\mu\text{mol/J}</math>)</b>	<b>2.55</b>	<b>1.99</b>

The fixtures both had a power factor of 1.00.

Spectral Output for the two fixtures is shown below (measured at 0.65 m).



## Conclusions

The efficacy of the Red-Blue fixture (2.55) was 94.4% of the 2.7  $\mu\text{mol/J}$  efficacy listed on the manufacturer's website. This is the highest LED efficacy we have measured to date. It surpasses the Philips red/blue Toplight fixture by 4 % (2.55/2.45).

The efficacy of the Full Spectrum light was not listed on the manufacturer's website. This efficacy (1.99) is 3 % less than a white light fixture from Fluence Bioengineering, which we measured at 2.05  $\mu\text{mol J}^{-1}$  in April 2017.

<sup>1</sup> Nelson, J. A., & Bugbee, B. (2014). Economic Analysis of Greenhouse Lighting: Light Emitting Diodes vs. High Intensity Discharge Fixtures. Plos ONE, 9(6), 1-10. doi:10.1371/journal.pone.0099010